

Maxprap. Chapter wise Series Class 10th Area Related to Circles

Class : 10th

Subject: Mathematics

Max. Marks : 50

Duration : 2 Hrs

Sections: A (MCQs), B (Short Answer-I), C (Short Answer-II), D (Long Answer), E (Case-Based).

General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 23 questions divided into five Sections A, B, C, D and E. (iii). Section A comprises of 10 MCQs of 1 mark each. Section B comprises of 5 questions of 2 marks each. Section C comprises of 4 questions of 3 marks each. Section D comprises of 2 question of 5 marks each and Section E comprises of 2 Case Study Based Questions of 4 marks each.
- (iv). There is no overall choice.
- (v). Use of Calculators is not permitted.
- (vi). Draw neat figures wherever required. Take $\pi = 22/7$, wherever required if not stated.

Section A

Questions 1 to 10 carry 1 mark each

1. Area of a sector of angle p (in degrees) of a circle with radius R is

- a) $\frac{p}{360} \times 2\pi R$ b) $\frac{p}{180} \times 2\pi R$ c) $\frac{p}{720} \times 2\pi R^2$ d) $\frac{p}{180} \times \pi R^2$

2. If a chord of a circle of radius 28 cm makes an angle of 90° at the centre, then the area of the major segment is

- a) 2240 cm^2 b) 1456 cm^2 c) 392 cm^2 d) 1848 cm^2

3. The area of a sector of a circle with radius r , making an angle of x° at the centre is

- a) $\frac{x}{360} \times 2\pi r$ b) $\frac{x}{180} \times 2\pi$ c) $\frac{x}{360} \times \pi r^2$ d) $\frac{x}{100} \times \pi r^2$

4. If the area of a sector of a circle is $\frac{7}{20}$ of the area of the circle, then the angle at the centre is equal to

- a) 126° b) 110° c) 130° d) 100°

5. The length of the minute hand of a wall clock is 7 cm, then area swept by the minute hand in 10 minutes is

- a) 30 cm^2 b) 30.66 cm^2 c) 28.69 cm^2 d) 25.66 cm^2

6. The area of the sector of a circle of radius 12 cm is $60\pi \text{ cm}^2$. The central angle of this sector is:

- a) 6° b) 150° c) 75° d) 120°

7. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. The length of the arc is

- a) 21 cm b) 22 cm c) 23.5 cm d) 18.16 cm

8. The area of a quadrant of a circle whose circumference is 616 cm will be
 a) 7564 cm^2 b) 7546 cm^2 c) 7456 cm^2 d) 7500 cm^2

Assertion(A)/Reason(R) Based (9-10): In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- a) Both A and R are true and R is the correct explanation of A.
 b) Both A and R are true but R is not the correct explanation of A.
 c) A is true but R is false.
 d) A is false but R is true.

9. Assertion (A): In a circle of radius 6 cm, the angle of a sector 60° . Then the area of the sector is $18\frac{6}{7} \text{ cm}^2$.

Reason (R): Area of the circle with radius r is πr^2 .

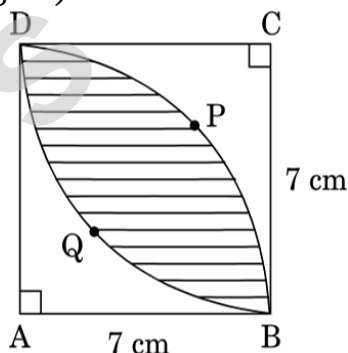
10. Assertion (A): Area of a segment of a circle of radius r units and central angle $60^\circ = \frac{1}{2} r^2 \left(\frac{\pi}{3} - \frac{\sqrt{3}}{2} \right)$

Reason (R): Area of a semicircle $= \frac{1}{2} \pi r^2$.

SECTION – B

Questions 11 to 15 carry 2 marks each

11. Calculate the area of the shaded region common between two quadrants of circles of radius 7 cm each (as shown in Figure).

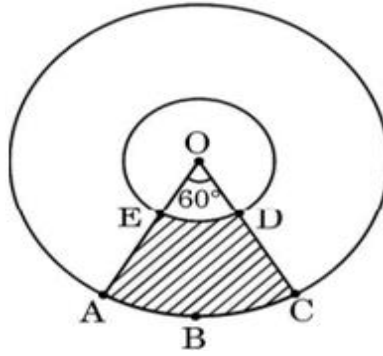


12. The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.

13. Find the area of a sector of a circle with radius 6 cm, if the angle of the sector is 60° .

14. To warn ships for underwater rocks, a lighthouse spreads a red coloured light over a sector of angle 80° to a distance of 16.5 km. Find the area of the sea over which the ships are warned.(use $\pi = 3.14$)

15. In the given figure, two concentric circles with centre O are shown. Radii of the circles are 2 cm and 5 cm respectively. Find the area of the shaded region.

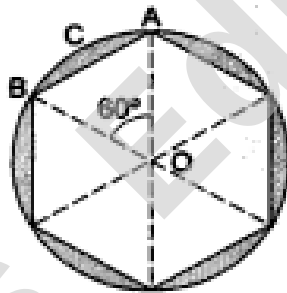


SECTION – C

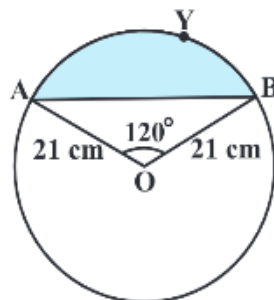
Questions 16 to 19 carry 3 marks each

16. A chord of a circle of radius 15 cm subtends an angle of 60° at the center. Find the areas of the corresponding minor and major segments of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$)

17. A round table cover has six equal designs, as shown in the figure. If the radius of the cover is 28 cm, find the cost of making the designs at the rate of Rs. 0.35 per cm^2 . [Use $\sqrt{3} = 1.7$.]



18. Find the area of the segment AYB shown in Figure, if the radius of the circle is 21 cm and $\angle AOB = 120^\circ$. (Use $\pi = \frac{22}{7}$).



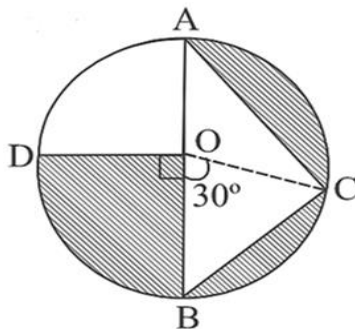
19. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre.

- Find the length of the arc,
- the area of the sector,
- the area of the minor segment, and
- the area of the major segment. [Given, $\sqrt{3} = 1.72$.]

SECTION – D

Questions 20 to 21 carry 5 marks each

20. O is the centre of the circle. If $AC = 28$ cm, $BC = 21$ cm, $\angle BOD = 90^\circ$ and $\angle BOC = 30^\circ$, then find the area of the shaded region given in the figure.



21. A chord of a circle of radius 10cm subtends a right angle at the center. Find the area of the corresponding: (Use $\pi = 3.14$)

- | | |
|-----------------|------------------|
| a) minor sector | c) minor segment |
| b) major sector | d) major segment |

SECTION – E (Case Study Based Questions)

Questions 22 & 23 carry 4 marks each

22. Read the following text carefully and answer the questions that follow:

Age of a tree: The most accurate way to determine the age of a tree is to count the annual rings of wood growth. One such trunk has been shown here.

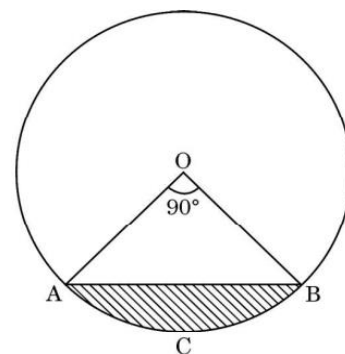


To make an identification mark, the forest department has painted segment ACBA. (See diagram) If chord AB makes an angle 90° at the centre and radius of the trunk is 21 cm, then find the:

- | | |
|------------------------------|-----|
| a) length of chord AB. | (1) |
| b) area of $\triangle OAB$. | (1) |
| c) area of segment ACBA. | (2) |

OR

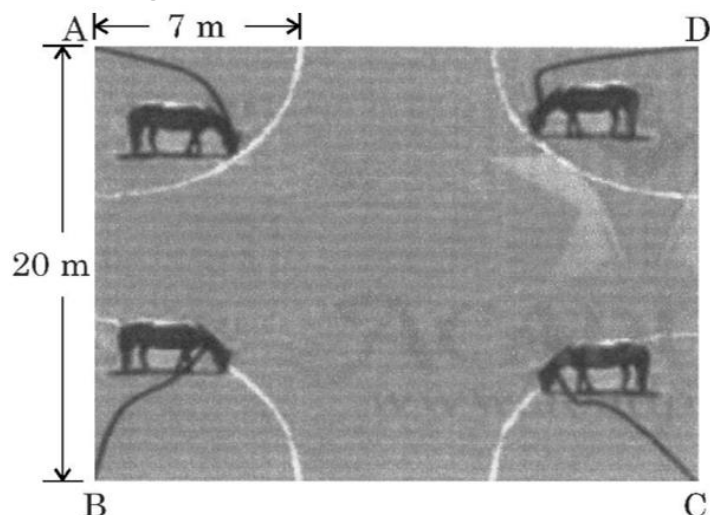
- | | |
|----------------------------|-----|
| perimeter of sector OACBO. | (2) |
|----------------------------|-----|



23. Read the following text carefully and answer the questions that follow:

A stable owner has four horses. He usually tie these horses with 7 m long rope to pegs at each corner of a square shaped grass field of 20 m length, to graze in his farm. But tying

with rope sometimes results in injuries to his horses, so he decided to build fence around the area so that each horse can graze.



Based on the above, answer the following questions:

1. Find the area of the square shaped grass field. (1)
2. Find the area of the total field in which these horses can graze. (2)

OR

If the length of the rope of each horse is increased from 7 m to 10 m, find the area grazed by one horse. (Use $\pi = 3.14$) (2)

3. What is area of the field that is left ungrazed, if the length of the rope of each horse is 7 cm? (1)

Area Related to the Circle Paper Details – Analysis		
Objective Questions		
MCQ	1 marks x 8 question = 8	
Assertion Reason	1 marks x 2 question = 2	
Subjective		
Short type I	2 marks x 5 question = 10	
Short type II	3 marks x 4 question = 12	
Long Type	5 marks x 2 question = 10	
Case Studies Based		
Case 1	4 marks	
Case 2	4 marks	

Total = 50 marks Your Score =